



# 2017 US AMOC Science Team Meeting

May 23-25, 2017 | Santa Fe, NM

## Task team 1 breakout discussion

Time: 13:15 to 15:05

# TT 1: Summary

## AMOC observing system implementation and evaluation

- How to transition into being a sustained observing system:
  - Show value of the observations: -papers, models, products (transport time series, density fields, error estimates)
  - Need a low bar for data accessibility (common format; not easy)
  - Demonstrate impacts
  - Synthesis experience with best practices
- NOAA funding is level for sustained observations & NOAA is open to doing sustained observations. A lot will still depend on advocacy by PIs. Hard to get younger generation on board.
- Clear need to show US AMOC achievements (OceanObs19).
- Synthesis/Review papers (goal = 3 based on the 3 motivating questions)

# TT 1:

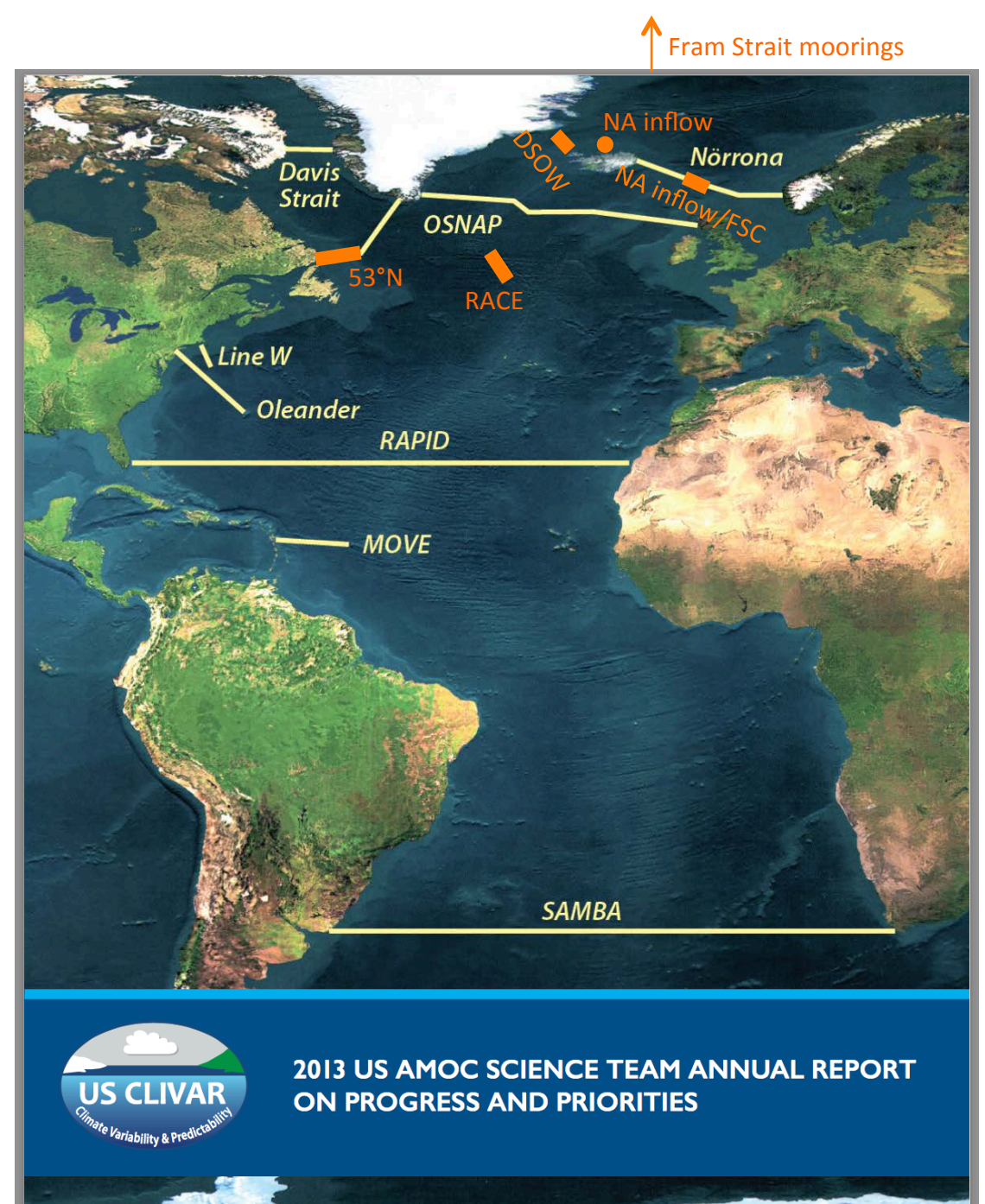
## AMOC observing system implementation and evaluation

- What is the observed AMOC variability and what are the underlying mechanisms driving variability? Highlight existing observational arrays. Lead author: Molly B. OSNAP, RAPID, MOCHA, MOVE, etc Pis.
  - Put observations into context. Historical Florida Current observations, other trends that not agree with AMOC slowdown.
- What is the meridional coherence of the observed AMOC? – Connect DWBC parts of the various arrays. Renellys = motivating force; big contributor = Isabela
  - Connect with TT2?
- What technological advances and novel combinations of existing and emerging data (and technologies) can be used to make AMOC observations sustainable into the future? Aspirational, promote Deepgliders, data pods (batches), SOOPs, etc...POC = Charlie & Tom, Josh Willis, Shenfu Dong, Felix Landerer, Kathy Donohue



# Topics

- Volunteer for notes
- US AMOC synthesis/review papers
- Summary/conclusion of session discussion on Tuesday.
- TT1 near-term priorities
- TT1 long-term priorities
- US AMOC synthesis/review papers - revisit



## A charge for the Breakout / Task Team groups:

Discuss review / synthesis paper topics (new topics?), taking into account what has been already published and in progress.

Suggest one to two topics that you think would address a gap with possible volunteers to lead the effort.

**Lead Authorships:** Volunteers and reached out

**Journals:** AGU; Current Climate Change Reports (a review journal); ....

## Tentative timeline:

June 2017: Draft list of topics and lead authors in collaboration with UK RAPID Program

July 2017: Confirm / finalize topics and authorships

January - February 2018: Submission deadline

## Preliminary list of potential paper themes which can be combined and/or expanded:

1. Characterizing the mean state of AMOC, and heat and salt transport by AMOC, over the whole Atlantic basin: Lozier et al. (2012); Marshall & Speer (2012); Vage et al. (2013); Straneo & Cenedese (2015); Haine et al. (2015); Perez et al. (2015); Buckley & Marshall (2016); Carmack et al. (2016); Rudels et al. (2018)
2. Characterizing the annual fluctuations of AMOC and the importance of winds vs. buoyancy forcing: OVERLAP
3. Inter-annual, decadal, centennial, etc. variations of AMOC and the mechanisms that drive them (including trends): Liu (2012); Srokosz et al. (2012); Srokosz & Bryden (2015); McCarthy et al. (2015); Buckley & Marshall (2016)
4. Impacts of AMOC on SST (e.g., AMV), SSH, sea-ice, weather, climate, ecosystems, ... (including paleo-climate linkages): Keenlyside et al. (2015); Kwon et al. (2018)

Review paper, gray zone, new

## Preliminary list of potential paper themes which can be combined and/or expanded:

5. AMOC fingerprints and proxies (somewhat related to #4): [Straneo & Heimbach \(2013\)](#)
6. Impacts of eddies/mesoscale variability on AMOC characteristics,
7. AMOC and climate prediction on various time scales: [Yeager & Robson \(2017\)](#)
8. AMOC (stability) thresholds: [Gent \(2018\)](#)
9. AMOC coherency,
10. ....

[Review paper](#), [gray zone](#), [new](#)

# Near-term priorities

- Improving understanding of the meridional coherence (and/or lack thereof) of the AMOC and the mechanisms that control AMOC changes continues to be a high near-term priority.
- The development of dynamically consistent model-data synthesis methods to combine the heterogeneous observational pieces will also play an important role in achieving this priority.
- Seeking new potential funding mechanisms to sustain key elements of the US AMOC observational networks is a new near-term priority.
- Expansion of the existing observing system to better capture the deep ocean and to better quantify the role of deep temperature and salinity signals in contributing to AMOC variability continues to be a priority. Enhancements such as Deep Argo, Deepgliders, and enhanced moored observations should be evaluated in the context of a full-depth observing system.



## Near-term priorities continued

- Ensuring that AMOC estimates are being made available in widely recognized locations such as the World Ocean Database, OceanSITES, the National Center for Environmental Information (NCEI), etc. These estimates should be accompanied by their key underlying measurements collected as part of the AMOC estimates as well as their error estimates on applicable time scales (days, weeks, months, and years) to provide the necessary precision information for analyses, inter-array comparisons, and numerical model studies.
- Improving communication between different US AMOC observing system groups, particularly between more established observing system groups and newer groups becoming involved at the national and international levels, continues to be a recommended activity.

## Long-term priorities

- Finding and/or developing new sustainable technologies and methods (including modeling and implementation techniques) for studying the AMOC and its key components will be necessary moving forward in order to address the overall observing goals for AMOC in a world of finite resources.
- Development of plans to observe and study the shallow and deep pathways of the AMOC through the basin at locations connecting the existing few trans-basin arrays will be important in the long-term. This may involve future Lagrangian studies in the South Atlantic and/or tropical Atlantic regions similar to the ongoing work in the high-latitude North Atlantic, or it may involve the development of new technologies and/or techniques.
- Rigorous testing of data assimilation schemes is needed in order to better understand how the systems are using the data collected, and better communication is needed between the US AMOC community and the data assimilation community.

# US AMOC synthesis papers – revisit

## Summary